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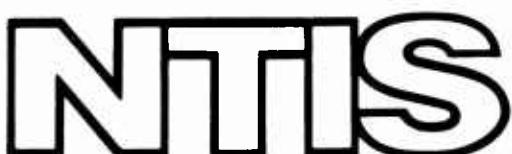
GUN SUPPORT TUBE ASSEMBLY

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27 June 1974

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5285 Port Royal Road, Springfield Va. 22151

Ser. No. 483-736

Filing Date JUNE 27, 1974

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GUN SUPPORT TUBE ASSEMBLY

ABSTRACT OF THE DISCLOSURE

A gun support tube assembly adapted for use with a Gatling-type gun. The assembly includes: a plurality of barrel clamps which hold and guide the cluster of the plurality of gun barrels; a plurality of stationary bearing sleeves, with one of each of the sleeves surrounding a different one of the barrel clamps; and, a stationary gun support tube, to the internal surface of which each of the bearing sleeves is removably attached, with the tube surrounding the cluster of gun barrels, the bearing sleeves, and the barrel clamps. When the cluster of plurality of gun barrels is rotated within the stationary gun support tube and the gun barrels are fired, the plurality of gun barrels is prevented from whipping; and, thereby, the boresight accuracy of the Gatling-type gun is maintained, unlike the prior art.

11.

BACKGROUND

This invention relates to a gun support tube assembly and, more particularly, to an adaptation thereof which is especially well-suited for use with a Gatling-type gun.

As is well known, Gatling guns and Gatling-type guns are machine guns which are characterized by having a revolving cluster

of gun barrels. More specifically, the barrels are grouped around a central axis or "shaft" (i.e., a longitudinal axis) around which the cluster of barrels, as a whole, rotates in the loading and firing of each barrel.

5 It is here to be noted that the terms "Gatling-type guns", or "such a gun", or the like, are intended also to include Gatling guns.

Equally well known in the art is the fact that, when such a gun is at operating speed and is fired, the barrels "whip" 10 (i.e., bend, jerk, or otherwise move very quickly and forcefully) at (and because of) each firing, with the result that the preset boresighting adjustment is rendered ineffective and, therefore, boresight accuracy is significantly and adversely affected.

1 Although the Gatling gun, and some of its successors, have been known for over a century, the "whipping" effect caused by the firing has not as yet been eliminated, despite the fact that such elimination has been a long-sought goal.

I have invented a unique gun support tube assembly which, 20 when adapted for and used with a Gatling-type gun, eliminates the "whipping" effect and, thereby, constitutes a significant advance in the state-of-the-art.

#### SUMMARY OF THE INVENTION

This invention pertains to a gun support tube assembly 25 in an adaptation for use with a Gatling-type gun.

An object of this invention is to teach an unique gun support tube assembly.

Another object of this invention is to teach an adaptation thereof which is especially well-suited for use with a 30 Gatling-type gun.

Still another object of this invention is to permit the use of a Gatling-type gun, without the previous hereto "whipping" effect of the Gatling-type gun barrels when said barrels are fired.

These objects, as well as other equally important and related objects (such as the elimination of the aft gun support, when my unique gun support tube assembly is used, with the resultant elimination of additional weight in the gun housing that would ordinarily be needed to overcome a bending moment), will become readily apparent after a consideration of the description of the invention and reference to the Figures of the drawings.

#### DESCRIPTION OF THE DRAWINGS

Figure 1 is a perspective view, in simplified schematic form, of a Gatling-type gun with which a preferred embodiment of my invention is used;

Figure 2 is a transverse cross-sectional view, taken along line 2-2 of Figure 1, of the Gatling-type gun and of the adaptation of my invention which is shown in Figure 1; and

Figure 3 is a partially fragmented longitudinal cross-sectional view, taken along circular line 3-3 of Figure 1, of the Gatling-type gun and of the adaptation of my invention which is shown in Figure 1.

#### DESCRIPTION OF THE PREFERRED EMBODIMENT

With reference to Figure 1, therein is shown a preferred embodiment of my invention, generally designated 10, in an adaptation especially well-suited for use with a Gatling-type gun, such as is generally designated by reference numeral 100, having a fore end 100B, an aft end 100A, a

diffuser 101 at the fore end 100B, and a revolvable cluster of gun barrels 102, with said cluster having a fore end 102F and an aft end 102G and a central axis A-B, and with said cluster 102 including representative barrels, such as 102A, 102B, 102C, 102D, and 102E, grouped around central axis A-B.

Still with reference to Figure 1, my preferred embodiment 10 is in the structural form of an assembly which includes, but is not limited to, a plurality of stationary bearing sleeves, such as representative ones 12A, 12B, 12C, and 12D, preferably made of beryllium copper, and a stationary gun support tube 13, preferably made of metal, having an internal surface 13A.

With reference to Figure 2, which is a transverse cross sectional view, as seen along line 2-2 of Figure 1, therein are shown: the representative plurality of barrels 102A-102E, inclusive, of the gun barrel cluster 102, Figure 1; the stationary gun support tube component 13 of the inventive assembly 10; one of the representative stationary bearing sleeves 12C of the inventive assembly 10, each of which said sleeves (such as 12C) is in abutting contact with the internal surface 13A of gun support tube 13; and, a representative one 11 of a plurality of barrel clamps which are components of the inventive assembly 10.

It is to be noted that the term "barrel clamp", or simply "clamp", is used herein as a word-of-art in the weaponry field in which the said term is used generically and historically, with regard to Gatling-type guns, to mean any retainer of the cluster of gun barrels; and, a "barrel clamp" or "clamp" in said art is not limited to a clamp per se, but also may

comprise more than one component. In this regard, and with reference to Figure 2 and my representative "barrel clamp" 11 therein, said clamp 11 comprises: a disk 11A, preferably made of steel, having a periphery 11B and also having suitable passageways therethrough to accept, hold, and guide whatever requires said acceptance, holding and guidance as, for example, representative gun barrels 102A-102E, inclusive; and, a ridge 11C on periphery 11B which may be, and in my preferred embodiment is, a separate but integrated component, preferably made of beryllium copper.

With reference to Figure 3, which is a longitudinal view taken along circular line 3 of Figure 1, partially fragmented and partially in cross section, therein are shown (in their relative positional relationship) a portion of the gun barrel cluster 102, including representative gun barrel cluster central axis A-B and representative components of the inventive assembly 10. These representative components therein include: one of the plurality of barrel clamps 14 with its disk 14A, disk periphery 14B, and disk periphery ridge 14C; one of the plurality of bearing sleeves 12D, with inner surface 12E and outer surface 12F; and, a portion of gun support tube 13 with internal surface 13A.

Returning to Figure 1, therein is shown in phantom for illustrative purposes the new end positions (i.e., A' and B') of central axis A-B, if the Gatling-type gun therein 100 were to be fired without the use of my inventive assembly. The "whipping" which would occur because of the firing would displace A to A', B to B', and would also result in a mid-axial vertical displacement which has been generally designated in

width by arrows and the character W.

#### MANNER OF OPERATION OF THE PREFERRED EMBODIMENT

The manner of operation of the preferred embodiment 10 of my invention, as adapted for use with a Gatling-type gun, 5 is easily understood from the foregoing description, coupled with reference to the drawings.

Succinctly, each of the barrel clamp ridges, such as representative one 14B of Figure 3, become or act as rubbing rings when the cluster of gun barrels 102, Figure 1, is rotated 10 during the firing and/or loading modes. These rubbing rings, such as 14B, rotate against the inner surface, such as 12E, Figure 1, of its respective stationary bearing sleeve, such as 12D of Figure 4, which surrounds its respective barrel clamp 14 and which is removably attached to the internal surface 15 13A of stationary gun support tube 13. As a result, the plurality of gun barrels 102 is prevented from whipping during the firing mode, and thereby the boresight accuracy of the gun is maintained.

Additionally, a Gatling-type gun with my inventive assembly 20 has a moment of inertia which is sufficient to eliminate, or at least to restrict (i.e., minimize), deflection or bending of the gun barrels at operating speed during firing. This is in contradistinction with or to the well known fact that, in the typical conventional present-day Gatling-type gun, the 25 mass and the low moment of inertia of the gun cause the barrels to bend at operating speed when fired, thus causing the preset boresighting adjustment to become ineffective.

Further, a Gatling-type gun with my inventive assembly has enough stiffness so that normally-used aft gun support (not shown) can be eliminated, thereby eliminating the adju-

tional weight in the gun housing which is required to overcome the bending moment induced by the diffuser, such as 101, Figure 1.

Also, a Gatling-type gun with my inventive assembly has 5 the capability of performance which it could not have without heavy structural framing members for support, which in turn would complicate the installation and removal of the gun.

#### CONCLUSION

It is abundantly clear from all of the foregoing, and 10 from the drawings herein, that the stated and desired objects of my inventive assembly have been attained. In addition, related desirable objects have also been achieved.

It is to be noted that, although there have been 15 described the fundamental and unique features of my invention as applied to a particular preferred embodiment for a specific adaptation, various other embodiments, additions, substitutions, omissions, adaptations, and the like, will occur to, and can be made by, those of 20 ordinary skill in the art without departing from the spirit of my invention.

What is claimed is:

CLAIMS

1. A gun support tube assembly, adapted for use with a Gatling-type gun having a cluster of a plurality of gun barrels, with said cluster having a fore end and an aft end, comprising:
  - a. a plurality of barrel clamps holding and guiding the plurality of gun barrels of the Gatling-type gun, wherein said barrel clamps are positioned in spaced relationship to each other and are also positioned intermediate of the fore and aft ends of the cluster of the plurality of gun barrels, and wherein each of said plurality of barrel clamps has a periphery and a ridge on said periphery;
  - b. a plurality of stationary bearing sleeves, one of each said sleeves for each one of the said plurality of barrel clamps, wherein each of said bearing sleeves has an inner surface and an outer surface, with the inner surface of each said bearing sleeve surrounding a different one of the plurality of barrel clamps;
  - c. and, a stationary gun support tube having an internal surface, wherein said internal surface is in contact with said outer surface of each of said plurality of bearing sleeves, with each said bearing sleeve removably attached to said internal surface of said stationary gun support tube, and wherein said support tube surrounds the cluster of the plurality of gun barrels of the Gatling-type gun, and said barrel clamps, and also said bearing sleeves; whereby, when the cluster of plurality of gun barrels is rotated within said stationary gun support tube and is fired, the plurality of gun barrels is prevented from whipping, and thereby the boresight accuracy of the Gatling-type gun is maintained.

2. A gun support tube assembly, as set forth in claim 1, wherein each said barrel clamp having a periphery includes a disk with suitable passageways therethrough.
3. A barrel clamp disk, as set forth in claim 2, wherein said disk is made of steel.
4. A gun support tube assembly, as set forth in claim 1 wherein each barrel clamp peripheral ridge is made of beryllium copper.
5. A gun support tube assembly, as set forth in claim 1, wherein each said bearing sleeve is made of beryllium copper.
6. A gun support tube assembly, as set forth in claim 1, wherein said stationary gun support tube is made of metal.

FIG. 1

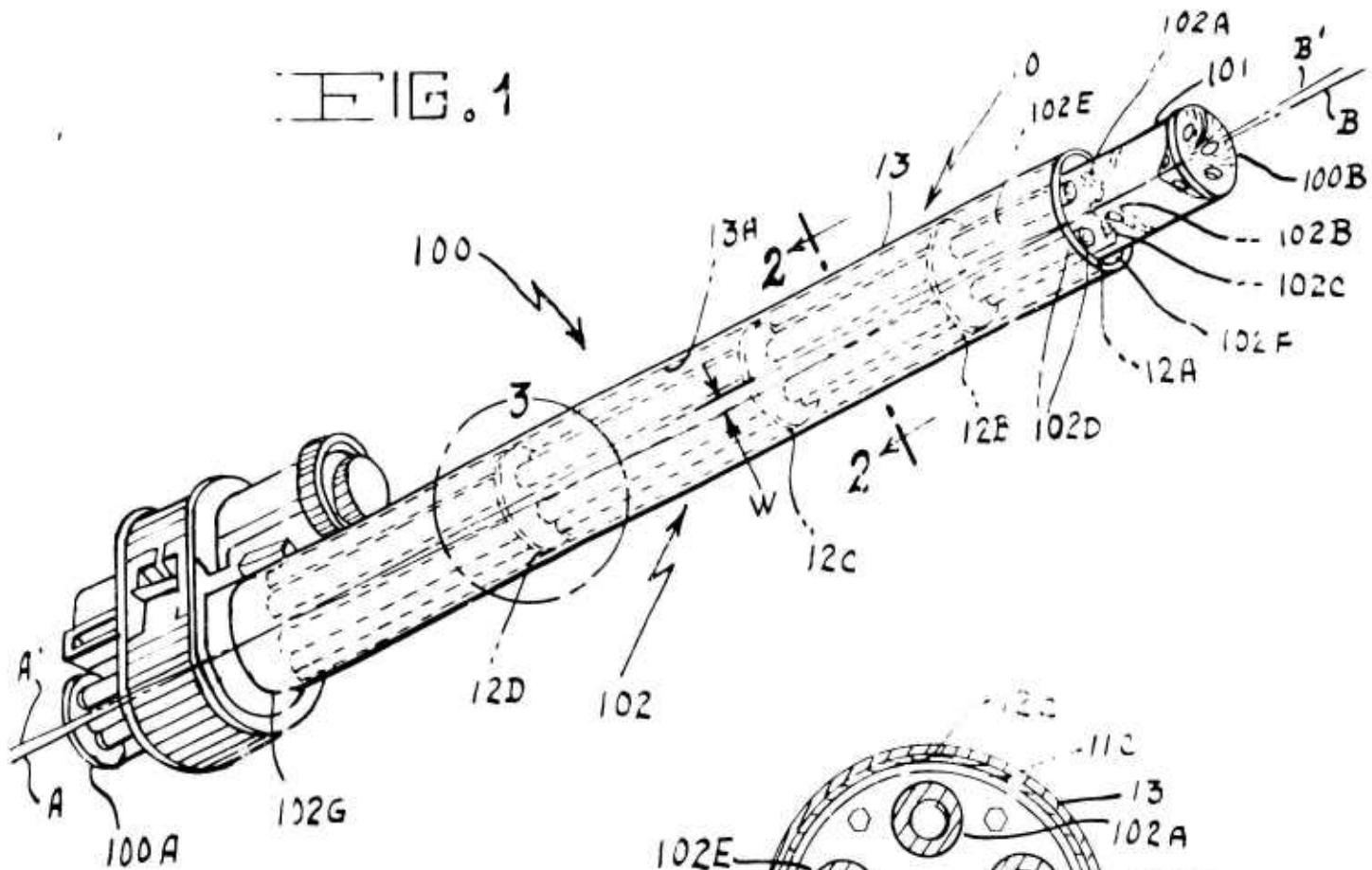


FIG. 2

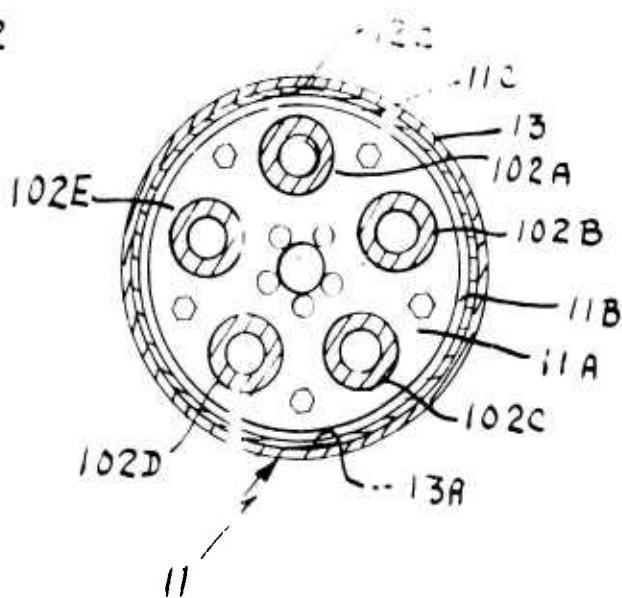


FIG. 3

